

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

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| Applicant's or agent's file reference P63242WO00 | FOR FURTHER ACTION | See item 4 below |
| International application No. PCT/GB2004/004835 | International filing date (<i>day/month/year</i>) 15 November 2004 (15.11.2004) | Priority date (<i>day/month/year</i>) 14 November 2003 (14.11.2003) |
| International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237 | | |
| Applicant MICROGEN ENERGY LIMITED | | |

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).
2. This REPORT consists of a total of 13 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

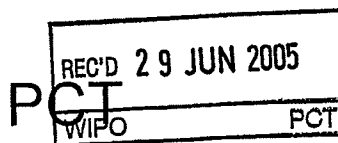
| | |
|--|---|
| <input checked="" type="checkbox"/> Box No. I | Basis of the report |
| <input checked="" type="checkbox"/> Box No. II | Priority |
| <input type="checkbox"/> Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input checked="" type="checkbox"/> Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input checked="" type="checkbox"/> Box No. VI | Certain documents cited |
| <input checked="" type="checkbox"/> Box No. VII | Certain defects in the international application |
| <input checked="" type="checkbox"/> Box No. VIII | Certain observations on the international application |

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).

| | |
|---|--|
| The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 740 14 35 | Date of issuance of this report 15 May 2006 (15.05.2006) Authorized officer <p style="text-align: center; font-weight: bold;">Dorothee Mülhausen</p> Telephone No. +41 22 338 87 40 |
|---|--|

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY



To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/GB2004/004835

International filing date (day/month/year)
15.11.2004

Priority date (day/month/year)
14.11.2003

International Patent Classification (IPC) or both national classification and IPC
F24H1/00, F02G1/043, F02G5/00, H02J3/38, G05D23/19, F24D19/10, F23N5/10

Applicant
MICROGEN ENERGY LIMITED

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☒ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/GB2004/004835

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/GB2004/004835

Box No. II Priority

1. ☐ The following document has not been furnished:

- ☐ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).
- ☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. ☒ The International Searching Authority has not been able to consider the validity of the priority claim because a copy of the earlier application whose priority has been claimed was not available to the International Searching Authority at the time that the search was conducted (Rule 17.1). This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

4. Additional observations, if necessary:

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has:

- ☒ paid additional fees.
- ☐ paid additional fees under protest.
- ☐ not paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is

- ☐ complied with
- ☒ not complied with for the following reasons:

see separate sheet

4. Consequently, this report has been established in respect of the following parts of the international application:

- ☒ all parts.
- ☐ the parts relating to claims Nos.

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/GB2004/004835

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-------------|---------------|
| Novelty (N) | Yes: Claims | 1-41 |
| | No: Claims | |
| Inventive step (IS) | Yes: Claims | 1-16,18-33,40 |
| | No: Claims | 17-39,41 |
| Industrial applicability (IA) | Yes: Claims | 1-41 |
| | No: Claims | |

2. Citations and explanations

see separate sheet

Box No. VI Certain documents cited

1. Certain published documents (Rules 43bis.1 and 70.10)

and / or

2. Non-written disclosures (Rules 43bis.1 and 70.9)

see form 210

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item IV

Lack of unity of invention

1. The separate inventions/groups of inventions are:

Invention 1: claims 1-16,18-33,40

Independent claim 1 and its dependent claims 2 to 14 and 18 to 33 relate to a domestic heat and power system comprising an energy scheduler, which receives the operating times of a domestic combined heat and power unit (dchp) and which sets the operation times of the domestic appliances.

Independent claim 15 relates to a domestic heat and power system serving a network comprising a hub controller which receives the operating times of a domestic combined heat and power unit (dchp) and which passes this information to a local energy scheduler. Said local energy scheduler sets the operating times of the domestic appliances.

Independent claim 40 relates to a method for using the domestic heat and power system comprising the step of scheduling operation of the domestic appliance to coincide with the operation time of the dchp unit.

Invention 2: claims 17-33,41

Independent claim 17 and its dependent claims 18 to 33 relate to a domestic heat and power system comprising a programmer module which receives from the user data input corresponding to time bands having start and end times, a desired temperature for the house during that time band and which generates a corresponding schedule therefrom and a controller which sets the operation times of the dchp units in accordance with the schedule provided by the programmer in such a way that the desired temperature is available at the start time of each time band.

Independent claim 41 relates to a method for using the domestic heat and power system comprising the steps of selecting time bands and temperature and scheduling operation of the dchp unit in such a way that the temperature of the home reaches the selected value at the start time of each time band.

Invention 3: claims 34,35

Independent claim 34 and its dependent claim 35 relate to a domestic combined heat and power unit comprising a burner and a controller, wherein the controller controls the firing rate of the burner depending on the rate of change of the home temperature.

Invention 4: claims 36-39

Independent claim 36 and its dependent claims 37 to 39 relate to a domestic combined heat and power unit comprising a burner and a controller, wherein the controller controls the firing rate of the burner in order to maintain a substantially constant temperature of the burner head.

2. They are not so linked as to form a single general inventive concept (Rule 13.1 PCT) for the following reasons:

The **special technical feature**, representing the contribution over document D1 of claims 1 to 14, 16 to 33 and 40 is the **energy scheduler** which sets the operation times for the domestic appliances. The operation of said domestic appliances can be optimised such that said appliance are operated **coincidentally** with the operation of the dchp unit (description page 2, line 28-30).

3. A **corresponding special technical feature** to the above mentioned "energy scheduler" is formed in claims 15 by the combination of the hub controller and the local energy scheduler. The operation of the domestic appliances can be optimised such that the appliances are operated **in accordance** with the operation time of the dchp unit.
4. The **special technical feature**, representing the contribution over document D1, of claims 17-33, 41 is a **control system** which ensures that the desired temperature is available at the start time defined by the user.
5. The **special technical feature**, representing the contribution over document D1, of

claims 34,35 is a **control system** dependent on the rate of change of the temperature of the home temperature.

6. The **special technical feature**, representing the contribution over document D1, of claims 36-39 is a **control system** for maintaining a substantially constant temperature of the burner head.
7. These special technical features are **neither the same nor corresponding** and appears to show lack of corresponding technical effect as well. Consequently, neither the objective problem underlying the subjects of the claimed inventions, nor their solutions defined by the special technical features allow for a relationship to be established between the said inventions, which involves a single general inventive concept.
8. In conclusion, the groups of claims are not linked by common or corresponding special technical features and define 4 different inventions not linked by a single general inventive concept.
The application, hence does not meet the requirements of unity of invention as defined in Rules 13.1 and 13.2 PCT.

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Reference is made to the following documents:

D1: WO 03/084023 A (MICROGEN ENERGY LIMITED; ALDRIDGE, WAYNE, KENNETH; CLARK, DAVID, ANTHO) 9 October 2003 (2003-10-09)
D2: FR-A-2 755 262 (GAZ DE FRANCE) 30 April 1998 (1998-04-30)
D3: US-A-4 620 668 (ADAMS ET AL) 4 November 1986 (1986-11-04)
D4: US-A-3 545 676 (GEORGE E. BARKER) 8 December 1970 (1970-12-08)
D5: US-B1-6 536 207 (KAMEN DEAN L ET AL) 25 March 2003 (2003-03-25)

2. The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and shows a domestic heat and power system.

First invention:

3. The subject-matter of claim 1 differs from this known system in that an energy scheduler is included, said energy scheduler being connected to electrical domestic appliances and being able of setting their operating times. The subject-matter of claim 1 is therefore new (Article 33(2) PCT).
4. The problem to be solved by the present invention may be regarded as improving the scheduling of electricity use within a home.
5. The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) since the operation of said domestic appliances can be optimised by operating said appliances coincidentally with the operation of the domestic combined heat and power (dchp) units.
6. Claims 2 to 14 and 16 to 33 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.
7. The document D1 is regarded also as being the closest prior art to the subject-matter of claim 15, and shows a domestic heat and power system serving a network of homes.
8. The subject-matter of claim 15 differs from this known system in that a local energy scheduler connected to a hub controller is included. The hub controller receives the operating times of a domestic combined heat and power unit and passes this information to the local energy scheduler. The local energy scheduler sets then the operation times of the domestic appliances. The subject-matter of claim 15 is therefore new (Article 33(2) PCT).
9. The problem to be solved is the same as for claim 1, and the solution contains a corresponding technical feature to the solution disclosed in said claim 1. Thus, claim

15 is therefore also considered inventive (Article 33(3) PCT).

10. The method disclosed in claim 40 correspond to with the subject-matter of claim 1 or 15 and is also considered new and inventive.

- **Second invention:**

11. The subject-matter of claim 17 differs from D1 in that a programmer module receives from the user data input corresponding to time bands and said programmer generates a schedule in such a way **that the desired temperature is available at the start time of each time band**. However, a control system has already been employed for the same purpose in a similar heating systems, see for example documents D2 and D3. It would be obvious to the person skilled in the art, namely when the same result is to be achieved, to apply these features with corresponding effect to a domestic heat and power system according to document D1, thereby arriving at a system according to claim 17. The same arguments apply mutatis mutandis for the subject-matter of the independent method claim 41.
12. Dependent claims 18 to 33 relate to slight constructional changes which come within the scope of the customary practice followed by persons skilled in the art, especially as the advantages thus achieved can readily be foreseen. Consequently, the subject-matter of claims 18 to 33 also lacks an inventive step.

- **Third invention:**

13. The subject-matter of claim 34 differs from D1 in that the controller **controls the firing rate of the burner depending on the rate of change of the home temperature**. Controlling a thermal engine depending on the home temperature is a normal design option known from the prior art and it is disclosed for example in D4. Dependent claim 35 relate only to a slight constructional change without any inventive effect.

- **Fourth invention:**

14. The subject-matter of claim 36 differs from D1 in that the controller **controls the firing rate of the burner in order to maintain a substantially constant temperature of the burner head**. A control system for a thermal engine based at least on the temperature of the heater head is already known from D5. Dependent claims 37 to 39 relate only to a slight constructional change without any inventive effect.

Re Item VI

Certain documents cited

US 2004/083732 A1 (HANNA WILLIAM THOMPSON ET AL) can be relevant for the third invention (claims 34 and 35).

Publ. Date: 6 May 2004 (2004-05-06)

Filing date: 18 August 2003 (2003-08-18)

Re Item VII

Certain defects in the international application

1. To meet the requirements of Rule 6.3(b) PCT, the independent claims should be properly cast in the **two part form**, with those features which in combination are part of the prior art being placed in the preamble (see document **D1**).
2. Reference signs in parentheses should be inserted in the claims to increase their intelligibility; this applies to both the preamble and characterising portion (Rule 6.2(b) PCT).
3. The **description** must be brought into conformity with the new claims to be filed (Rule 5.1(a)(iii) PCT); care should be taken during revision, especially of the introductory portion including any statements of problem or advantage, not to add subject-matter which extends beyond the content of the application as originally filed (Article 34(2) PCT).
4. The expression "**as described by the appended claims**" should be added on page 33, line 10 of the description to avoid an expansion of the extent of protection in

some vague and not precisely defined way (PCT-Guidelines Section IV, III-4.3a and III-6.5).

5. Moreover, the applicant's attention is drawn to the fact that, as a consequence of Rule 66.8(a) PCT the examiner is not permitted to carry out any amendments under the PCT procedure, however minor these may be.

Re Item VIII

Certain observations on the international application

1. Claims 1 does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined.
2. It seems clear from the description on page 2, line 28 to 30 that the following feature is essential to the definition of the invention:
 - the operation of the domestic appliance can be optimised when the appliance is operated **coincidentally** with the operation of the dchp unit.

Since independent claim 1 does not contain this feature, it does not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

3. The technical term "dchp" employed in claim 1 is not generally accepted in the art, contrary to the requirements of Rule 10.1(e) PCT.
4. For the sake of the clarity, the preamble of claims 5,6 and 7 should be redirected to "a **domestic** heat and power system".

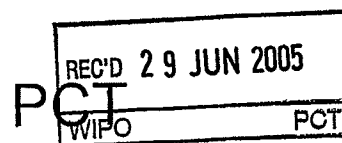
**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/GB2004/004835

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY



To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/GB2004/004835

International filing date (day/month/year)
15.11.2004

Priority date (day/month/year)
14.11.2003

International Patent Classification (IPC) or both national classification and IPC
F24H1/00, F02G1/043, F02G5/00, H02J3/38, G05D23/19, F24D19/10, F23N5/10

Applicant
MICROGEN ENERGY LIMITED

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☒ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1 b/s(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/GB2004/004835

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/GB2004/004835

Box No. II Priority

1. ☐ The following document has not been furnished:

- ☐ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).
- ☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. ☒ The International Searching Authority has not been able to consider the validity of the priority claim because a copy of the earlier application whose priority has been claimed was not available to the International Searching Authority at the time that the search was conducted (Rule 17.1). This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.
4. Additional observations, if necessary:

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has:

- ☒ paid additional fees.
- ☐ paid additional fees under protest.
- ☐ not paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is

☐ complied with

☒ not complied with for the following reasons:

see separate sheet

4. Consequently, this report has been established in respect of the following parts of the international application:

- ☒ all parts.
- ☐ the parts relating to claims Nos.

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/GB2004/004835

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-------------|---------------|
| Novelty (N) | Yes: Claims | 1-41 |
| | No: Claims | |
| Inventive step (IS) | Yes: Claims | 1-16,18-33,40 |
| | No: Claims | 17-39,41 |
| Industrial applicability (IA) | Yes: Claims | 1-41 |
| | No: Claims | |

2. Citations and explanations

see separate sheet

Box No. VI Certain documents cited

1. Certain published documents (Rules 43bis.1 and 70.10)

and / or

2. Non-written disclosures (Rules 43bis.1 and 70.9)

see form 210

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item IV

Lack of unity of invention

1. The separate inventions/groups of inventions are:

Invention 1: claims 1-16,18-33,40

Independent claim 1 and its dependent claims 2 to 14 and 18 to 33 relate to a domestic heat and power system comprising an energy scheduler, which receives the operating times of a domestic combined heat and power unit (dchp) and which sets the operation times of the domestic appliances.

Independent claim 15 relates to a domestic heat and power system serving a network comprising a hub controller which receives the operating times of a domestic combined heat and power unit (dchp) and which passes this information to a local energy scheduler. Said local energy scheduler sets the operating times of the domestic appliances.

Independent claim 40 relates to a method for using the domestic heat and power system comprising the step of scheduling operation of the domestic appliance to coincide with the operation time of the dchp unit.

Invention 2: claims 17-33,41

Independent claim 17 and its dependent claims 18 to 33 relate to a domestic heat and power system comprising a programmer module which receives from the user data input corresponding to time bands having start and end times, a desired temperature for the house during that time band and which generates a corresponding schedule therefrom and a controller which sets the operation times of the dchp units in accordance with the schedule provided by the programmer in such a way that the desired temperature is available at the start time of each time band.

Independent claim 41 relates to a method for using the domestic heat and power system comprising the steps of selecting time bands and temperature and scheduling operation of the dchp unit in such a way that the temperature of the home reaches the selected value at the start time of each time band.

Invention 3: claims 34,35

Independent claim 34 and its dependent claim 35 relate to a domestic combined heat and power unit comprising a burner and a controller, wherein the controller controls the firing rate of the burner depending on the rate of change of the home temperature.

Invention 4: claims 36-39

Independent claim 36 and its dependent claims 37 to 39 relate to a domestic combined heat and power unit comprising a burner and a controller, wherein the controller controls the firing rate of the burner in order to maintain a substantially constant temperature of the burner head.

2. They are not so linked as to form a single general inventive concept (Rule 13.1 PCT) for the following reasons:

The **special technical feature**, representing the contribution over document D1 of claims 1 to 14, 16 to 33 and 40 is the **energy scheduler** which sets the operation times for the domestic appliances. The operation of said domestic appliances can be optimised such that said appliance are operated **coincidentally** with the operation of the dchp unit (description page 2, line 28-30).

3. A **corresponding special technical feature** to the above mentioned "energy scheduler" is formed in claims 15 by the combination of the hub controller and the local energy scheduler. The operation of the domestic appliances can be optimised such that the appliances are operated **in accordance** with the operation time of the dchp unit.
4. The **special technical feature**, representing the contribution over document D1, of claims 17-33, 41 is a **control system** which ensures that the desired temperature is available at the start time defined by the user.
5. The **special technical feature**, representing the contribution over document D1, of

claims 34,35 is a **control system** dependent on the rate of change of the temperature of the home temperature.

6. The **special technical feature**, representing the contribution over document D1, of claims 36-39 is a **control system** for maintaining a substantially constant temperature of the burner head.
7. These special technical features are **neither the same nor corresponding** and appears to show lack of corresponding technical effect as well. Consequently, neither the objective problem underlying the subjects of the claimed inventions, nor their solutions defined by the special technical features allow for a relationship to be established between the said inventions, which involves a single general inventive concept.
8. In conclusion, the groups of claims are not linked by common or corresponding special technical features and define 4 different inventions not linked by a single general inventive concept.
The application, hence does not meet the requirements of unity of invention as defined in Rules 13.1 and 13.2 PCT.

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1. Reference is made to the following documents:

D1: WO 03/084023 A (MICROGEN ENERGY LIMITED; ALDRIDGE, WAYNE, KENNETH; CLARK, DAVID, ANTHO) 9 October 2003 (2003-10-09)
D2: FR-A-2 755 262 (GAZ DE FRANCE) 30 April 1998 (1998-04-30)
D3: US-A-4 620 668 (ADAMS ET AL) 4 November 1986 (1986-11-04)
D4: US-A-3 545 676 (GEORGE E. BARKER) 8 December 1970 (1970-12-08)
D5: US-B1-6 536 207 (KAMEN DEAN L ET AL) 25 March 2003 (2003-03-25)

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/GB2004/004835

2. The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and shows a domestic heat and power system.

First invention:

3. The subject-matter of claim 1 differs from this known system in that an energy scheduler is included, said energy scheduler being connected to electrical domestic appliances and being able of setting their operating times. The subject-matter of claim 1 is therefore new (Article 33(2) PCT).
4. The problem to be solved by the present invention may be regarded as improving the scheduling of electricity use within a home.
5. The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) since the operation of said domestic appliances can be optimised by operating said appliances coincidentally with the operation of the domestic combined heat and power (dchp) units.
6. Claims 2 to 14 and 16 to 33 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.
7. The document D1 is regarded also as being the closest prior art to the subject-matter of claim 15, and shows a domestic heat and power system serving a network of homes.
8. The subject-matter of claim 15 differs from this known system in that a local energy scheduler connected to a hub controller is included. The hub controller receives the operating times of a domestic combined heat and power unit and passes this information to the local energy scheduler. The local energy scheduler sets then the operation times of the domestic appliances. The subject-matter of claim 15 is therefore new (Article 33(2) PCT).
9. The problem to be solved is the same as for claim 1, and the solution contains a corresponding technical feature to the solution disclosed in said claim 1. Thus, claim

15 is therefore also considered inventive (Article 33(3) PCT).

10. The method disclosed in claim 40 correspond to with the subject-matter of claim 1 or 15 and is also considered new and inventive.

- **Second invention:**

11. The subject-matter of claim 17 differs from D1 in that a programmer module receives from the user data input corresponding to time bands and said programmer generates a schedule in such a way **that the desired temperature is available at the start time of each time band**. However, a control system has already been employed for the same purpose in a similar heating systems, see for example documents D2 and D3. It would be obvious to the person skilled in the art, namely when the same result is to be achieved, to apply these features with corresponding effect to a domestic heat and power system according to document D1, thereby arriving at a system according to claim 17. The same arguments apply mutatis mutandis for the subject-matter of the independent method claim 41.
12. Dependent claims 18 to 33 relate to slight constructional changes which come within the scope of the customary practice followed by persons skilled in the art, especially as the advantages thus achieved can readily be foreseen. Consequently, the subject-matter of claims 18 to 33 also lacks an inventive step.

- **Third invention:**

13. The subject-matter of claim 34 differs from D1 in that the controller **controls the firing rate of the burner depending on the rate of change of the home temperature**. Controlling a thermal engine depending on the home temperature is a normal design option known from the prior art and it is disclosed for example in D4. Dependent claim 35 relate only to a slight constructional change without any inventive effect.

- **Fourth invention:**

14. The subject-matter of claim 36 differs from D1 in that the controller **controls the firing rate of the burner in order to maintain a substantially constant temperature of the burner head**. A control system for a thermal engine based at least on the temperature of the heater head is already known from D5. Dependent claims 37 to 39 relate only to a slight constructional change without any inventive effect.

Re Item VI

Certain documents cited

US 2004/083732 A1 (HANNA WILLIAM THOMPSON ET AL) can be relevant for the third invention (claims 34 and 35).

Publ. Date: 6 May 2004 (2004-05-06)

Filing date: 18 August 2003 (2003-08-18)

Re Item VII

Certain defects in the international application

1. To meet the requirements of Rule 6.3(b) PCT, the independent claims should be properly cast in the **two part form**, with those features which in combination are part of the prior art being placed in the preamble (see document **D1**).
2. Reference signs in parentheses should be inserted in the claims to increase their intelligibility; this applies to both the preamble and characterising portion (Rule 6.2(b) PCT).
3. The **description** must be brought into conformity with the new claims to be filed (Rule 5.1(a)(iii) PCT); care should be taken during revision, especially of the introductory portion including any statements of problem or advantage, not to add subject-matter which extends beyond the content of the application as originally filed (Article 34(2) PCT).
4. The expression "**as described by the appended claims**" should be added on page 33, line 10 of the description to avoid an expansion of the extent of protection in

some vague and not precisely defined way (PCT-Guidelines Section IV, III-4.3a and III-6.5).

5. Moreover, the applicant's attention is drawn to the fact that, as a consequence of Rule 66.8(a) PCT the examiner is not permitted to carry out any amendments under the PCT procedure, however minor these may be.

Re Item VIII

Certain observations on the international application

1. Claims 1 does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined.
2. It seems clear from the description on page 2, line 28 to 30 that the following feature is essential to the definition of the invention:
 - the operation of the domestic appliance can be optimised when the appliance is operated **coincidentally** with the operation of the dchp unit.

Since independent claim 1 does not contain this feature, it does not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

3. The technical term "dchp" employed in claim 1 is not generally accepted in the art, contrary to the requirements of Rule 10.1(e) PCT.
4. For the sake of the clarity, the preamble of claims 5,6 and 7 should be redirected to "a **domestic** heat and power system".

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/GB2004/004835

INTERNATIONAL SEARCH REPORT

PCT/GB2004/004835

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 F24H1/00 F02G1/043 F02G5/00 H02J3/38 G05D23/19
 F24D19/10 F23N5/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 F24H F02G H02J G05D F24D F23N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| A | WO 03/084023 A (MICROGEN ENERGY LIMITED; ALDRIDGE, WAYNE, KENNETH; CLARK, DAVID, ANTHO) 9 October 2003 (2003-10-09) cited in the application the whole document | 1-16, 18-33,40 |
| Y | ----- | 17-39,41 |
| A | DE 101 11 072 A1 (ROBERT BOSCH GMBH) 2 October 2002 (2002-10-02) abstract; figures 1,2 | 1-16, 18-33 |
| A | WO 01/61820 A (POWERLINE GES PTY LTD; CHAMBERS, COLIN, JAMES; COLIN, RICHARD, ERNEST) 23 August 2001 (2001-08-23) abstract | 15 |
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☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *Z* document member of the same patent family

Date of the actual completion of the international search

25 May 2005

Date of mailing of the international search report

28.06.2005

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INTERNATIONAL SEARCH REPORT

PCT/GB2004/004835

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| A | SWEET W: "Networking assets distributed generation" IEEE SPECTRUM, IEEE INC. NEW YORK, US, vol. 38, no. 1, January 2001 (2001-01), pages 84-86,88, XP002245189 ISSN: 0018-9235 the whole document | 15 |
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| A | US 4 620 668 A (ADAMS ET AL) 4 November 1986 (1986-11-04) abstract; figures 1-3 | 17-33,41 |
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| A | EP 0 444 308 A (BUDERUS HEIZTECHNIK GMBH) 4 September 1991 (1991-09-04) abstract | 17-33,41 |
| Y | US 3 545 676 A (GEORGE E. BARKER) 8 December 1970 (1970-12-08) columns 1,2 | 34,35 |
| Y | US 6 536 207 B1 (KAMEN DEAN L ET AL) 25 March 2003 (2003-03-25) column 3, line 8 - line 17; figures 1,2 | 36-39 |
| A | US 5 248 083 A (ADAMS ET AL) 28 September 1993 (1993-09-28) abstract; figure 1 | 36 |
| A | US 4 231 222 A (FENTON ET AL) 4 November 1980 (1980-11-04) abstract | 36 |
| P,X | US 2004/083732 A1 (HANNA WILLIAM THOMPSON ET AL) 6 May 2004 (2004-05-06) paragraph '0039!; figure 1 | 34,35 |

INTERNATIONAL SEARCH REPORT

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Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-16,18-33,40

Independent claim 1 and its dependent claims 2 to 14 and 18 to 33 relate to a domestic heat and power system comprising an energy scheduler, which receives the operating times of a domestic combined heat and power unit (dchp) and which sets the operation times of the domestic appliances.

Independent claim 15 relates to a domestic heat and power system serving a network comprising a hub controller which receives the operating times of a domestic combined heat and power unit (dchp) and which passes this information to a local energy scheduler. Said local energy scheduler sets the operating times of the domestic appliances.

Independent claim 40 relates to a method for using the domestic heat and power system comprising the step of scheduling operation of the domestic appliance to coincide with the operation time of the dchp unit.

2. claims: 17-33,41

Independent claim 17 and its dependent claims 18 to 33 relate to a domestic heat and power system comprising a programmer module which receives from the user data input corresponding to time bands having start and end times, a desired temperature for the house during that time band and which generates a corresponding schedule therefrom and a controller which sets the operation times of the dchp units in accordance with the schedule provided by the programmer in such a way that the desired temperature is available at the start time of each time band.

Independent claim 41 relates to a method for using the domestic heat and power system comprising the steps of selecting time bands and temperature and scheduling operation of the dchp unit in such a way that the temperature of the home reaches the selected value at the start time of each time band.

3. claims: 34,35

Independent claim 34 and its dependent claim 35 relate to a domestic combined heat and power unit comprising a burner and a controller, wherein the controller controls the firing rate of the burner depending on the rate of change of the home temperature.

4. claims: 36-39

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Independent claim 36 and its dependent claims 37 to 39
relate to a domestic combined heat and power unit comprising
a burner and a controller, wherein the controller controls
the firing rate of the burner in order to maintain a
substantially constant temperature of the burner head.

INTERNATIONAL SEARCH REPORT

Information on patent family members

PCT/GB2004/004835

| Patent document cited in search report | | Publication date | Patent family member(s) | Publication date |
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| | | US 2004226296 A1 | 18-11-2004 |
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